# HVAC & CONTROL SYMBOLS

| SYMBOL | DESCRIPTION | SYMBOL | DESCRIPTION |
|---|---|---|---|
| M | MOTOR | T | DUCT THERMOSTAT |
| | CENTRIFUGAL FAN | H | HUMIDISTAT, ROOM |
| T | ROOM OR ZONE THERMOSTAT | H | HUMIDISTAT, DUCT |
| SD | SMOKE DETECTOR, DUCT | P | PRESSURE SWITCH |
| | DAMPER, OPPOSED BLADE | TT | TEMPERATURE TRANSMITTER (SENSOR) |
| MD | MOTORIZED DAMPER ACTUATOR | PT/PS | PRESSURE TRANSMITTER OR SWITCH |
| FD | FIRE DAMPER | DP DP-S | DIFFERENTIAL PRESSURE CONTROLLER |
| SD | SMOKE DAMPER | BDD | BACKDRAFT DAMPER, GRAVITY |
| FSD | COMBINATION FIRE/SMOKE DAMPER | BD | BALANCING DAMPER (CFM CONTROL) |
| 12"X10" | RECTANGULAR DUCT (REFER TO SYS) | 8"Ø | ROUND DUCT-REFER TO SYSTEM SERVED |
| 12"X10" | LINED RECTANGULAR DUCT | 8"Ø | ROUND LINED OR DOUBLE WALL DUCT |

# DUCT CONSTRUCTION SPECIFICATION

1. RECTANGULAR DUCT SHALL BE GALVANIZED G60 OR G90 GRADE SHEETMETAL FORMED AND FABRICATED IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS-METAL AND FLEXIBLE FOR PRESSURE CLASS OF 2" WG MINIMUM. 26 GAGE METAL MINIMUM.
2. ROUND DUCT SHALL BE GALVANIZED G60 OR G90 GRADE SHEETMETAL SPIRAL DUCTING FORMED IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS-METAL AND FLEXIBLE FOR PRESSURE CLASS OF 2" WG MINIMUM. DIE CAST OR WELDED ELBOWS AND FITTINGS MEETING THE SAME SPECIFICATION ALLOWED. AT CONTRACTOR OPTION, LONGITUDE LOCK SEAM (SNAPPY) DUCT AND ADJUSTABLE FITTINGS ARE ALLOWED ONLY ON RESTROOM EXHAUST. 26 GAGE METAL MINIMUM.
3. SEAL ALL DUCT SEAMS IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS-METAL AND FLEXIBLE TABLE 1-2 SEAL CLASS B, MINIMUM.
4. DUCT CONNECTOR SHALL BE STANDARD SLIP 'S' AND DRIVE CONNECTOR OF METAL GAGE NOT LESS THAN DUCT GAGE SPECIFIED IN #1. PROPRIETARY FLANGE CONNECTIONS SUCH AS WARD OR DUCT-MATE ARE ENCOURAGED.
5. SUPPORT ALL DUCTING IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS-METAL AND FLEXIBLE. NO EXCEPTIONS!
6. DUCT LINER SHALL BE 1" OWENS CORNING 'LINA-COOUSTIC' BRAND, OR EQUAL. INSTALL ACCORDING TO MFR. RECOMMENDATIONS.
7. INSULATE ALL EXTERIOR (OUTDOOR) DUCTING WITH RIGID 2" FIBERGLASS INSULATION WITH SEALED GALVANIZED CLADDING.
8. ALL RECTANGULAR ELBOWS TO CONTAIN SINGLE OR DOUBLE TURNING VEIN.

# DUCT INSULATION/LINER REQUIREMENTS

INSULATED DUCTWORK INCLUDES (2" THICKNESS/R-5 VALUE):
- COMBUSTION AIR VENTS TO ALL UNIT HEATERS.

TEST & BALANCE INSTRUCTIONS:

BALANCER SHALL BE BIGHORN BALANCING, RGO, OR PRIOR APPROVED EQUAL.
THE BALANCING CONTRACTOR SHALL PERFORM AIR AND WATER
BALANCE IN ACCORDANCE WITH MINIMUM NEBB GUIDELINES AND
REPORT THE FOLLOWING DATA:

1. OPERATING AMPERAGE MEASURED UNDER FULL LOAD.
2. MEASURED VOLTAGE AT EACH UNIT.
3. ESP OF EACH AIR MOVING EQUIPMENT.
4. TOTAL MEASURED AND ADJUSTED CFM RETURN, SUPPLY, OUTSIDE AIR, AND EXHAUST.
5. INITIAL PRESSURE DROP ACROSS FILTERS.
6. GPM AND HEAD PUMPS.
7. CFM DIFFUSERS.
8. INIITIAL AND FINAL OUTDOOR AIR CFM.

THE FOLLOWING PIECES OF EQUIPMENT SHALL RECEIVE TESTING & BALANCING TREATMENT:

A. EF-1 AND EF-2 (ADD ALTERNATE #1).
B. UH-1, UH-2, AND UH-3.
C. CU-1 AND AC-1.

# DUCTWORK SYMBOLS KEY

SECTION THROUGH RETURN OR EXHAUST AIR
SECTION THROUGH SUPPLY OR OUTSIDE AIR DUCT
SUPPLY, RETURN, EXHAUST, OR OUTSIDE AIR DUCT
ACCESS DOOR (BOTTOM OR SIDE) — AD
ACOUSTICALLY LINED DUCT
DAMPER, FIRE — FD
DAMPER, MANUAL VOLUME — BD
INCLINED DROP IN DIRECTION OF ARROW — D
INCLINED RISE IN DIRECTION OF ARROW — R
TRANSITION, RECTANGULAR TO ROUND
FLEXIBLE DUCT — OR
TRANSITION OR OFFSETTING TRANSITION
TRANSITION, RECTANGULAR
HIGH EFFICIENCY TAKEOFF WITH DAMPER
CEILING SUPPLY AIR DIFFUSER ##
SIDEWALL SUPPLY AIR REGISTER ##
ELBOW TURNED DOWN
ELBOW TURNED UP
ELBOW, RADIUS TYPE
ELBOW, SQUARE OR RECTANGULAR TYPE WITH 22 GA SINGLE TURNING VANES
RETURN OR EXHAUST AIR DUCT
CEILING RETURN AIR REGISTER ##
SIDEWALL RETURN AIR REGISTER ##
OPEN END DUCT
FLEXIBLE CONNECTION

# BASIC MECHANICAL REQUIREMENTS

FURNISH ALL LABOR AND MATERIALS AND PERFORM ALL OPERATIONS NECESSARY FOR THE INSTALLATION OF COMPLETE AND OPERATING MECHANICAL SYSTEMS SUBJECT TO THE CONDITIONS OF THE CONTRACT. PROVIDE SATISFACTORY OPERATION OF ALL EQUIPMENT AND CONTROLS TO THE ARCHITECT/ENGINEER UPON REQUEST.

ALL MATERIALS SHALL BE NEW. SUBSTITUTIONS SHALL BE APPROVED BY OWNER AND/OR ENGINEER.

VISIT THE PREMISES BEFORE SUBMITTING BID AS NO CHANGE ORDERS WILL BE ALLOWED FOR LACK OF KNOWLEDGE OF EXISTING CONDITIONS.

COORDINATE AND ORDER THE PROGRESS OF WORK TO CONFORM TO THE PROJECT SCHEDULE AND THE PROGRESS OF THE WORK OF THE OTHER TRADES.

MECHANICAL DRAWINGS ARE DIAGRAMMATIC AND BECAUSE OF THE SMALL SCALE, IT IS NOT POSSIBLE TO INDICATE EVERY REQUIRED OFFSET, FITTING, ETC. VERIFY ALL SPACE REQUIREMENTS, COORDINATING WITH OTHER TRADES, AND INSTALL THE SYSTEMS IN THE SPACE PROVIDED WITHOUT EXTRA CHARGES TO THE OWNER.

PERFORM WORK IN ACCORDANCE WITH GOOD COMMERCIAL PRACTICE. THE GOOD APPEARANCE OF THE FINISHED WORK SHALL BE OF EQUAL IMPORTANCE WITH ITS MECHANICAL EFFICIENCY AND INTENT. THE OWNER MAY REJECT WORK IF WORKMANSHIP AND APPEARANCE ARE NOT SATISFACTORY.

INSTALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH THE MANUFACTURERS' RECOMMENDATIONS UNLESS SPECIFICALLY INDICATED OTHERWISE, OR WHERE LOCAL CODES OR REGULATIONS TAKE PRECEDENCE.

COMPLY WITH STATE AND LOCAL CODE REQUIREMENTS AND ORDINANCES. COMPLY WITH REQUIREMENTS OF THE UTILITY COMPANIES. IN THE CASE OF DIFFERENCES BETWEEN THESE REQUIREMENTS AND ORDINANCES, THE MOST STRINGENT SHALL GOVERN. CALL FOR INSPECTIONS REQUIRED BY LOCAL BUILDING INSPECTION AUTHORITY.

PLANS AND SPECIFICATIONS GO HAND IN HAND. WHAT IS REQUIRED IN ONE IS REQUIRED IN BOTH. WHERE CONFLICTS BETWEEN SPECIFICATIONS AND PLANS EXIST, THE MOST STRINGENT REQUIREMENTS SHALL APPLY.

MECHANICAL PLANS SUPERCEDE ARCHITECTURAL PLANS. BACKGROUND FLOOR PLANS USED FOR MECHANICAL DRAWINGS MAY SHOW DIFFERENT THAN THE FINAL ARCHITECTURAL LAYOUT. REFER TO ARCHITECTURAL DRAWINGS FOR ACTUAL DIMENSIONS AND LAYOUT PLACEMENTS FOR SPACE CONDITIONS.

MECHANICAL DETAILS MAY OR MAY NOT BE DIRECTLY REFERENCED. ALL DETAILS SHOWN ARE TO BE USED FOR BASIS OF INSTALLATION IN ALL CASES, IN COORDINATED EFFORT WITH MANUFACTURERS INSTALLATION RECOMMENDATIONS.

MECHANICAL SHEETS ARE NOT INTENDED TO SPECIFICALLY BE TRADE SPECIFIC TO MECHANICAL INSTALLATION WORK. ALL MECHANICAL AND ELECTRICAL TRADES ARE RESPONSIBLE FOR FAMILIARIZING THEMSELVES AND INCLUDING A COMPLETE PACKAGE WITHIN THEIR OFFER FOR A COMPLETE SYSTEM.

AT COMPLETION OF WORK, DELIVER COMPLETED PROJECT RECORD DOCUMENTS MARKED WITH FIELD CHANGES TO OWNER.

PROVIDE A WRITTEN WARRANTY TO THE OWNER COVERING THE ENTIRE MECHANICAL WORK TO BE FREE FROM DEFECTIVE MATERIALS, EQUIPMENT AND WORKMANSHIP FOR A PERIOD OF 1 YEAR AFTER DATE OF ACCEPTANCE.

CLEAN EXPOSED SURFACES OF FURNACES, HOT WATER HEATERS, PLUMBING FIXTURES AND OTHER EXPOSED ITEMS OF GREASE, DIRT OR OTHER FOREIGN MATERIAL. REMOVE RUBBISH AND DEBRIS RESULTING FROM THE OPERATIONS AND LEAVE EQUIPMENT SPACES CLEAN AND READY FOR USE.

MAINTAIN ALL CEILING, FLOOR AND WALL FIRE AND SMOKE PROTECTION RATINGS. SEAL ALL CONDUIT AND ENCLOSURE PENETRATIONS TO COMPLY WITH UL ASSEMBLY AND BUILDING CODE REQUIREMENTS. ALL SEALANTS AND CONSTRUCTIONS SHALL BE APPROVED BY OWNER PRIOR TO APPLICATION. ALL OPENINGS SHALL BE SEALED DAILY.

CONTRACT DRAWINGS FOR MECHANICAL WORK ARE IN PART DIAGRAMMATIC, INTENDED TO CONVEY THE SCOPE OF WORK AND INDICATE GENERAL ARRANGEMENT OF EQUIPMENT, CONDUITS, AND APPROXIMATE SIZES AND LOCATIONS OF EQUIPMENT AND OUTLETS. MECHANICAL/ELECTRICAL TRADES SHALL FOLLOW THESE DRAWINGS IN LAYING OUT THEIR WORK, CONSULT GENERAL CONSTRUCTION DRAWINGS TO FAMILIARIZE THEMSELVES WITH ALL CONDITIONS AFFECTING THEIR WORK, AND SHALL VERIFY SPACES IN WHICH THEIR WORK WILL BE INSTALLED. COORDINATE WORK WITH OTHER TRADES AND AS PROJECT CONDITIONS REASONABLY REQUIRE WITHOUT EXTRA COSTS TO OWNER.

HVAC SPECIFIC:
ALL DUCTWORK DIMENSIONS, AS SHOWN ON THE DRAWINGS, ARE INTERNAL CLEAR DIMENSIONS AND DUCT SIZE SHALL BE INCREASED TO COMPENSATE FOR DUCT LINING THICKNESS.

PROVIDE ALL 90 DEGREE SQUARE ELBOWS WITH SINGLE RADIUS TURNING VANES UNLESS OTHERWISE INDICATED.

COORDINATE DIFFUSER, REGISTER, AND GRILLE LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS, LIGHTING, AND OTHER CEILING ITEMS AND MAKE DUCT MODIFICATIONS TO SUIT.

AT CONTRATORS OPTION, FLEXIBLE DUCT MAY BE USED TO CONNECT SUPPLY REGISTERS AND DIFFUSERS ON THIS PROJECT ONLY. RUNS OF FLEXIBLE DUCT SHALL NOT EXCEED 5 FEET, UNLESS SPECIFICALLY SHOWN ON DRAWING.

ALL DUCTWORK SHALL BE COORDINATED WITH ALL TRADES INVOLVED. OFFSETS IN DUCTS, INCLUDING DIVIDED DUCTS AND TRANSITIONS AROUND OBSTRUCTIONS, SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER.

MECHANICAL SYSTEMS SHALL COMPLY WITH INTERNATIONAL MECHANICAL CODE VER 2012 AND INTERNATIONAL ENERGY CODE VER 2012.

PLUMBING/PIPING SPECIFIC:
PLUMBING/PIPING SYSTEMS SHALL COMPLY WITH INTERNATIONAL FUEL GAS CODE VER 2012 AND UNIFORM PLUMBING CODE VER 2012.

UTILITIES:
LOCATION OF UNDERGROUND UTILITIES ARE APPROXIMATE. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE EXACT LOCATIONS IN THE FIELD (NOT ALL UTILITIES ARE SHOWN).

REGULATORY AND CODE REQUIREMENTS:
APPLY FOR AND PAY FOR ALL PERMITS, FEES, LICENSES AND INSPECTIONS. ALL WORK IS SUBJECT TO APPROVAL BY THE CODE OFFICIAL AND ENGINEER. ALL CORRECTIONS SHALL BE MADE WITHOUT EXTRA COSTS TO OWNER.

811 CALL BEFORE YOU DIG

# MEP ABBREVIATIONS

| | |
|---|---|
| AFF | ABOVE FINISHED FLOOR |
| AFG | ABOVE FINISHED GRADE |
| A/G | ABOVE GRADE |
| B/G | BELOW GRADE |
| COND | CONDENSATE DRAIN |
| CWR | CHILLED (HYDRONIC) WATER RETURN |
| CWS | CHILLED (HYDRONIC) WATER SUPPLY |
| DCW | DOMESTIC (POTABLE) COLD WATER |
| DHW | DOMESTIC (POTABLE) HOT WATER |
| DHWR | DOMESTIC HOT WATER RETURN |
| EA | ENTERING AIR |
| EC | ELECTRICAL CONTRACTOR |
| EX | EXHAUST |
| G-SAN | GREASE SANITARY SEWER |
| GC | GENERAL CONTRACTOR |
| HC | HVAC CONTRACTOR |
| HWR | HOT (HYDRONIC) WATER RETURN |
| HWS | HOT (HYDRONIC) WATER SUPPLY |
| HP | HIGH PRESSURE |
| IJS | IN JOIST SPACE |
| LA | LEAVING AIR |
| LP | PROPANE GAS |
| MA | MIXED AIR |
| MC | MECHANICAL CONTRACTOR |
| MP | MEDIUM PRESSURE |
| MPG | MEDIUM PRESSURE NATURAL GAS |
| NG | NATURAL GAS |
| OA | OUTSIDE/OUTDOOR AIR |
| PC | PLUMBING CONTRACTOR |
| RA | RETURN AIR |
| RECT | RECTANGULAR |
| SA | SUPPLY AIR |
| SAN | SANITARY SEWER |
| SS | STORM WATER SEWER |
| STM | STEAM |
| SYS | SYSTEM |
| TEMP | TERMPERATURE |
| V | VENT |

## GENERAL CONSTRUCTION NOTES

ALL WORK PERFORMED IN CONJUNCTION WITH THESE DRAWINGS SHALL MEET ALL CURRENT APPLICABLE BUILDING AND ENERGY CODES.

ALL WORK PERFORMED IN CONJUNCTION WITH THESE DRAWINGS IS SUBJECT TO APPROVAL BY THE AUTHORITY HAVING JURISDICTION (CODE OFFICIAL).

ALL ROOF PENETRATIONS SHALL BE PATCHED AND SEALED, WITH WARRANTY FROM BUILDING ROOFING CONTRACTOR.

THIS SET OF DOCUMENTS IS INTENDED FOR AHJ REVIEW AND SHALL BE CONSIDERED AS CONSTRUCTION DOCUMENTS. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE ALL CONDITIONS, EXISTING AND/OR NEW, OF THE SITE AS WELL AS LOCATIONS, QUANTITIES, TYPE AND STYLE OF ALL PRODUCTS PROVIDED, WITH OWNER, PRIOR TO ORDERING OR INSTALLING.

# PIPE MATERIAL AND INSTALLATION REQUIREMENTS

| SERVICE OR SYSTEM | MATERIAL | PIPE SIZE | INSULATION THICKNESS | PIPE SIZE | PRESSURE TEST* | NOTES: |
|---|---|---|---|---|---|---|
| DOMESTIC COLD WATER | TYPE L COPPER, VIEGA PEX MODEL V5001 (INSIDE WALLS AND CRAWLSPACE ONLY), PRO-PRESS | ALL | 1/2" FIBERGLASS | ALL | 100 PSI AIR-30 MIN | 1,2 |
| DOMESTIC HOT WATER (100-180 DEG F) | TYPE L COPPER, VIEGA PEX MODEL V5002 (INSIDE WALLS AND CRAWLSPACE ONLY), PRO-PRESS | ALL | 1" FIBERGLASS | ALL | 100 PSI AIR-30 MIN | 1,2 |
| NATURAL GAS | BLACK T&C WITH BMI FITTINGS | <=2" | NONE | N/A | 40 PSI AIR-60 MIN | 2 |
| | WELDED STEEL SCH 40 | >2" | | | | |
| SANITARY SEWER U/G | SCHEDULE 40 PVC DWV, HUBLESS CAST IRON | ALL | NONE | N/A | 20 PSI AIR-60 MIN | |
| SANITARY SEWER A/G | SCHEDULE 40 PVC DWV, HUBLESS CAST IRON | ALL | NONE | N/A | 20 PSI AIR-60 MIN | 2 |
| CONDENSATE | SCHEDULE 40 PVC DWV (FLEXIBLE TUBING NOT ALLOWED) | ALL | NONE | N/A | VISUAL INSPECTION | |

NOTES:
1. INSULATION TO BE OF HEAVY DENSITY BONDED FIBERGLASS WITH ALL SERVICE JACKET (WHITE). FITTING TO BE PVC ZESTON COVERS WITH FLEXIBLE INSULATION WRAP. SEAL ALL JOINTS WITH SEALANT. K VALUE NOT EXCEEDING 0.27 BTU PER IN/H*FT^2*DEG F.
2. SEISMIC BRACE ALL PIPE GREATER THAN 2-1/2" ID PER LOCAL CODE.

GENERAL NOTE ALL: SEAL ALL NON RATED STRUCTURE PIPE PENETRATIONS INCLUDING DRAFT STOPS WITH SILICON OR FIRE RATED EXPANDING FOAM. SEAL ALL RATED PIPE PENETRATIONS IN ACCORDANCE WITH CONTRACTOR SELECTED MFR FIRE CAULK SYSTEM (AND/OR FIRE COLLAR) AND MATCH RATING WITH SPECIFIC UL LISTING. PROVIDE ENGINEER AND INSPECTOR FOR AHJ WITH SHOP DRAWING OF RATED ASSEMBLY PRIOR TO INSTALLATION.

* PROVIDE WRITTEN AND SIGNED REPORT BY CONTRACTOR FOR ALL SYSTEMS TESTED, TYPE OF TEST, DATE, PRESSURE, TIME START, TIME END, AND SYSTEM TESTED. SUBMIT TO ENGINEER IN IOM SUBMITTAL.

# PLUMBING/PIPING SYMBOLS

| SYMBOL | DESCRIPTION | SYMBOL | DESCRIPTION |
|---|---|---|---|
| | GATE, BALL, OR FUEL SOV VALVE | | UNION, THREADED OR FLANGED |
| | GLOBE VALVE | WH | WATER HAMMER ARRESTOR |
| | GAS COCK | | FLOOR DRAIN |
| | PLUG VALVE | * | FLOOR SINK |
| S | SOLENOID VALVE | | FLOOR CLEANOUT, INT. OR EXT. |
| PRV | PRESSURE REDUCING VALVE | CO | WALL CLEANOUT |
| | CHECK VALVE | | 1/4 TURN BOILER DRAIN W/CAP |
| | PRESS./TEMP. RELIEF VALVE | | HOSE BIBB, INTERIOR OR EXTERIOR |
| | RPP BACKFLOW PREVENTOR | | 90 DEGREE ELBOW (UP, DOWN, PLAN) |
| | DOUBLE CHECK BACKFLOW PREV. | | TEE FITTING (UP, DOWN, PLAN) |
| | WATER METER | | WYE (PLAN VIEW) |
| | PRESSURE REDUCING VALVE | | COMBINATION WYE & 1/8 BEND |
| | THERMOMETER WITH WELL | | WYE (VERTICAL) WITH 1/4 BEND |
| | PRESSURE GAGE WITH SHUTOFF | | LONG RADIUS SAN. SEWER FITTING |
| P | PRESSURE SWITCH | ABV | AUTOMATIC BALANCING VALVE |
| | PUMP | MBV | MANUAL BALANCING VALVE |
| | CONTROL VALVE, 2-WAY | | DIRECTION OF FLOW |
| | CONTROL VALVE, 3-WAY | | STRAINER, CAST IRON OR BRONZE |
| | NG OR LP EQUIPMENT REGULATOR | | STRAINER WITH BLOW DOWN & PLUG |
| | FLEXIBLE PIPE CONNECTOR | | EXPANSION VALVE |
| S | STEAM TRAP | | AUTO AIR VENT, EXTEND TO DRAIN |
| | PUMP OR CIRCULATOR | FS OR F | FLOW SWITCH |

## SHEET INDEX



PERMIT SET


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MONTANA RAYMOND E DAWES No. 19034PE LICENSED PROFESSIONAL ENGINEER

MONTANA FWP - BIG SPRINGS FISH HATCHERY

2051 FISH HATCHERY ROAD
LEWISTOWN, MT. 59457

SHEET CONTENTS:
PROJECT REQUIREMENTS & SPECIFICATIONS

ISSUE DATE:
DATE 08/20/18
DRAWN BY: CR
CHECKED BY: RD
REV #: -
REV DATE: -

| REV # | DATE |
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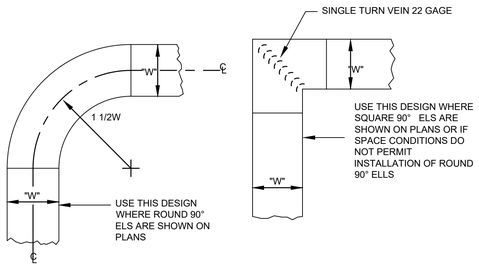
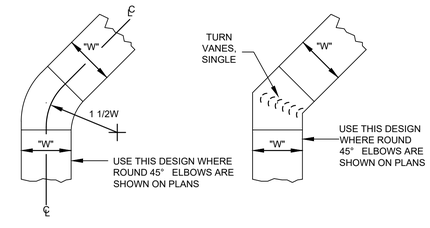



1 M0.1 CONSTRUCTION OF 90° ELBOWS DETAIL
SCALE: NTS




2 M0.1 CONSTRUCTION OF 45° ELBOWS DETAIL
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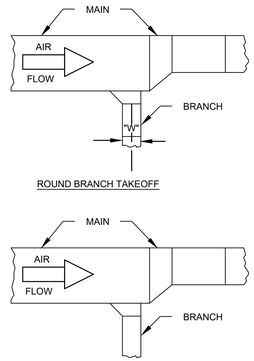


3 M0.1 CONSTRUCTION OF BRANCH TAKEOFF'S FROM MAIN DETAIL
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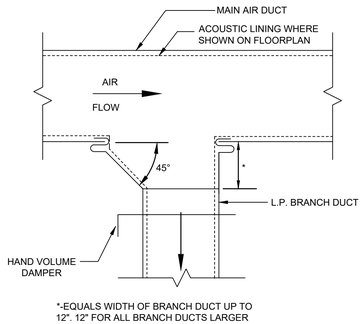


4 M0.1 HIGH EFFICIENCY TAKE-OFF DETAIL
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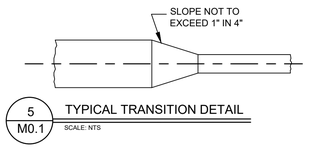


5 M0.1 TYPICAL TRANSITION DETAIL
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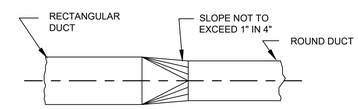


6 M0.1 TYPICAL RECTANGULAR TO ROUND TRANSITION DETAIL
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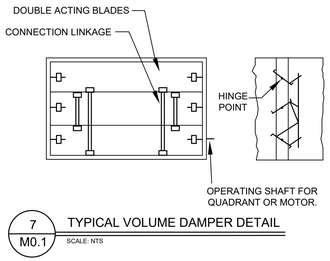


7 M0.1 TYPICAL VOLUME DAMPER DETAIL
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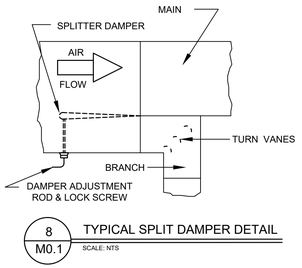


8 M0.1 TYPICAL SPLIT DAMPER DETAIL
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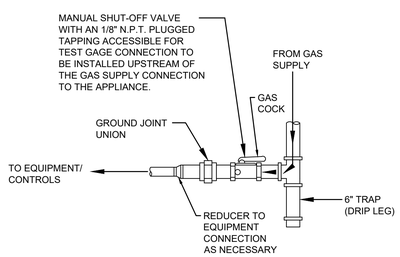


9 M0.1 GAS CONNECTION TO EQUIPMENT DETAIL
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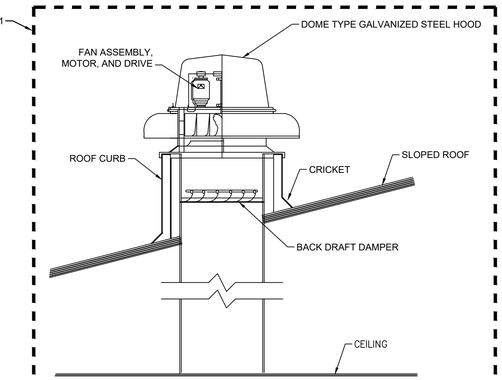


10 M0.1 ROOF EXHAUST FAN DETAIL
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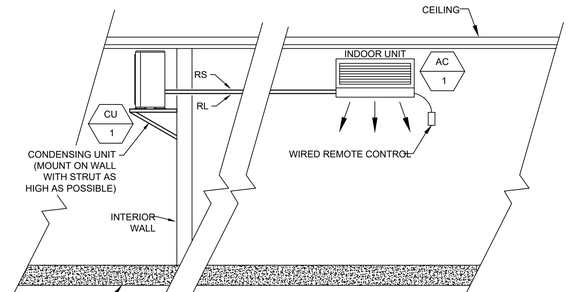



11 M0.1 TYPICAL INSTALLATION OF SPLIT HEAT PUMP DETAIL
SCALE: NTS

## GAS FIRED UNIT HEATER SCHEDULE (UH #)

| EQUIPMENT NO. | SERVICE | CFM | INPUT (BTU) | OUTPUT (BTU) | EFFIC IENCY A.F.U.E. | GAS RATE (CFH) | GAS CONN SIZE | VENT OUTLET SIZE | ELECTRIC AMPS | ELECTRIC V-PH-CY. | ELECTRIC MOTOR HP | MANUFACTURER & MODEL | OPTIONS-ACCESSORIES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UH-1 | HEATING | 3843 | 300K | 249K | 83% | - | 3/4 | 6 | 11 | 115-1-60 | 1/2 | REZNOR UDAS-300 | 1,2,3,4 |
| UH-2 | HEATING | 3843 | 300K | 249K | 83% | - | 3/4 | 6 | 11 | 115-1-60 | 1/2 | REZNOR UDAS-300 | 1,2,3,4 |
| UH-3 | HEATING | 1345 | 105K | 87.15K | 83% | - | 1/2 | 4 | 3.9 | 115-1-60 | 1/20 | REZNOR UDAS-100 | 1,2,3,4 |

NOTES:
1. ADD FACTORY VERTICAL COMBUSTION AIR/VENT KIT.
2. PROVIDE HONEYWELL T800 OR EQUAL.
3. PROVIDE WITH 30° DOWNTURN NOZZLE.
4. FAN IS TO RUN DURING OCCUPIED PERIODS 8AM TO 6PM EVERY DAY TO MOVE AIR INSIDE BUILDING FOR RADON MITIGATION.

## DUCTLESS SPLIT AIR CONDITIONING SYSTEM SCHEDULE (CU # / AC #)

| EQUIP NO. | SERVICE | COOLING/HEATING CAPACITY (BTU/HR.) | CFM | REFRIGERANT | DESIGN TEMPERATURE (°F) INDOOR | DESIGN TEMPERATURE (°F) OUTDOOR | ELECTRICAL MCA | ELECTRICAL VOLT-PH-CY. | MANUFACTURER & MODEL | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| AC-1 | HEAT PUMP | 12,000/14,200 | 406 | R410-A | 70 DB | 47 DB/43 WB | 13 | 220-1-60 | TOSHIBA RAS-12EKV-UL | 1,2 |
| CU-1 | HEAT PUMP | 12,000/14,200 | 406 | R410-A | 70 DB | 47 DB/43 WB | 13 | 220-1-60 | TOSHIBA RAS-12EAV2-UL | 1,2,3 |

NOTES:
1. PROVIDE WITH WIRED CONTROLLER TO BE MOUNTED ON WALL AS SHOWN IN PLANS.
2. REFRIGERANT PIPING TO BE INSULATED SEPARATELY.
3. CONDENSING UNIT TO BE INSTALLED INDOORS AS SHOWN ON PLANS.

ADD ALTERNATE #1

## FAN SCHEDULE (EF #)

| EQUIP NO. | SERVICE | LOCATION | CFM | STATIC PRESS. (IN. H.G.) | MOTOR AMP. | MOTOR HP. | MOTOR SONES | MOTOR VOLT-PH-CY. | MANUFACTURER & MODEL | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| EF-1 | EXHAUST (ROOF) | NORTH HATCHERY | 200 | .35 | 0.65 | 1/10 | 4.8 | 115-1-60 | GREENHECK G-070-VG | 1,2,3 |
| EF-2 | EXHAUST (ROOF) | MAIN HATCHERY | 750 | .35 | 4.4 | 1/6 | 9.0 | 115-1-60 | GREENHECK G-095-VG | 1,2,3 |

NOTES:
1. FAN TO OPERATE CONTINUOUSLY.
2. PROVIDE WITH FACTORY BACKDRAFT DAMPER.

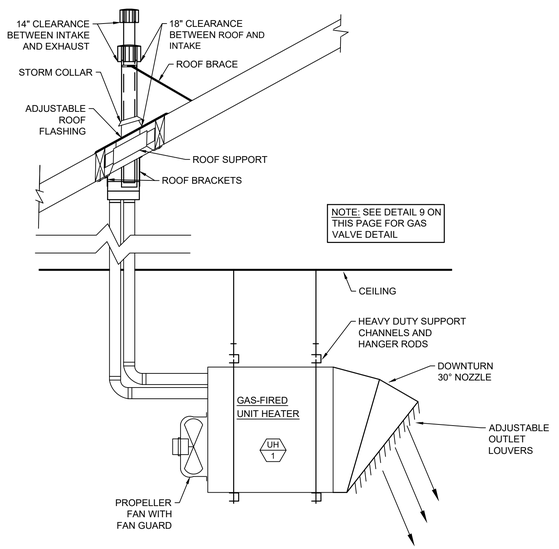
## HVAC SPECIALTY SCHEDULE

| TAG NO. | SIZE | TYPE | MANUFACTURER & MODEL | NOTES | ADDITIONAL NOTES |
|---|---|---|---|---|---|
| HETO* | VARIES | HIGH EFFICIENCY DUCT TAKEOFF | HERCULES HTO | | WITH LOCKING QUAD |
| BD* | VARIES | BALANCING DAMPER ROUND | NAILOR 1890 | | WITH LOCKING QUAD |
| BD* | VARIES | BALANCING DAMPER RECTANGULAR (<10" SINGLE / GREATER OPP BLD) | NAILOR 1870 / 1020 | | WITH LOCKING QUAD |
| MD* | VARIES | MOTORIZED DAMPER ROUND | NAILOR 1090 | 1 | |
| MD* | VARIES | MOTORIZED DAMPER RECTANGULAR (<10" SINGLE / GREATER OPP BLD) | NAILOR 1870 / 1020 | 1 | |

1. PROVIDE WITH MOTORIZED ACTUATOR WITH END SWITCH PROOF, CONTRACTOR TO SELECT PREFERRED VOLTAGE AND WIRE TO CONTROL DEVICE AS NECESSARY.

NOTE: ALL ITEMS LISTED ON THIS SCHEDULE ARE CONSIDERED BASIS OF DESIGN, AND PRODUCTS CONSIDERED EQUAL SHALL BE ELIGIBLE TO BE SUPPLIED AND INSTALLED ON THIS PROJECT, UPON APPROVAL OF ENGINEER.

* INDICATES ITEMS THAT MAY NOT BE SPECIFICALLY TAGGED ON PLAN SHEETS, BUT ARE NOTED IN FLOOR PLANS, DETAILS, SECTIONS, OR CALLOUTS SHALL BE PROVIDED AND INSTALLED BY THE CONTRACTOR BASED ON REQUIREMENTS ASSOCIATED WITH THIS PROJECT.




12 M0.1 GAS FIRED UNIT HEATER INSTALLATION DETAIL
SCALE: NTS

PERMIT SET

Dawes Engineering & Design
46 Hibbard Way
Helena, MT 59601
(406) 441-4000 p



MONTANA RAYMOND E. DAWES No. 9002PE REGISTERED PROFESSIONAL ENGINEER

MONTANA FWP - BIG SPRINGS FISH HATCHERY

2051 FISH HATCHERY ROAD
LEWISTOWN, MT. 59457

SHEET CONTENTS:
MECHANICAL SCHEDULES & DETAILS

ISSUE DATE:
DATE 08/20/18
DRAWN BY: CR
CHECKED BY: RD
REV #: -
REV DATE: -

| REV # | DATE |
|---|---|
| | |

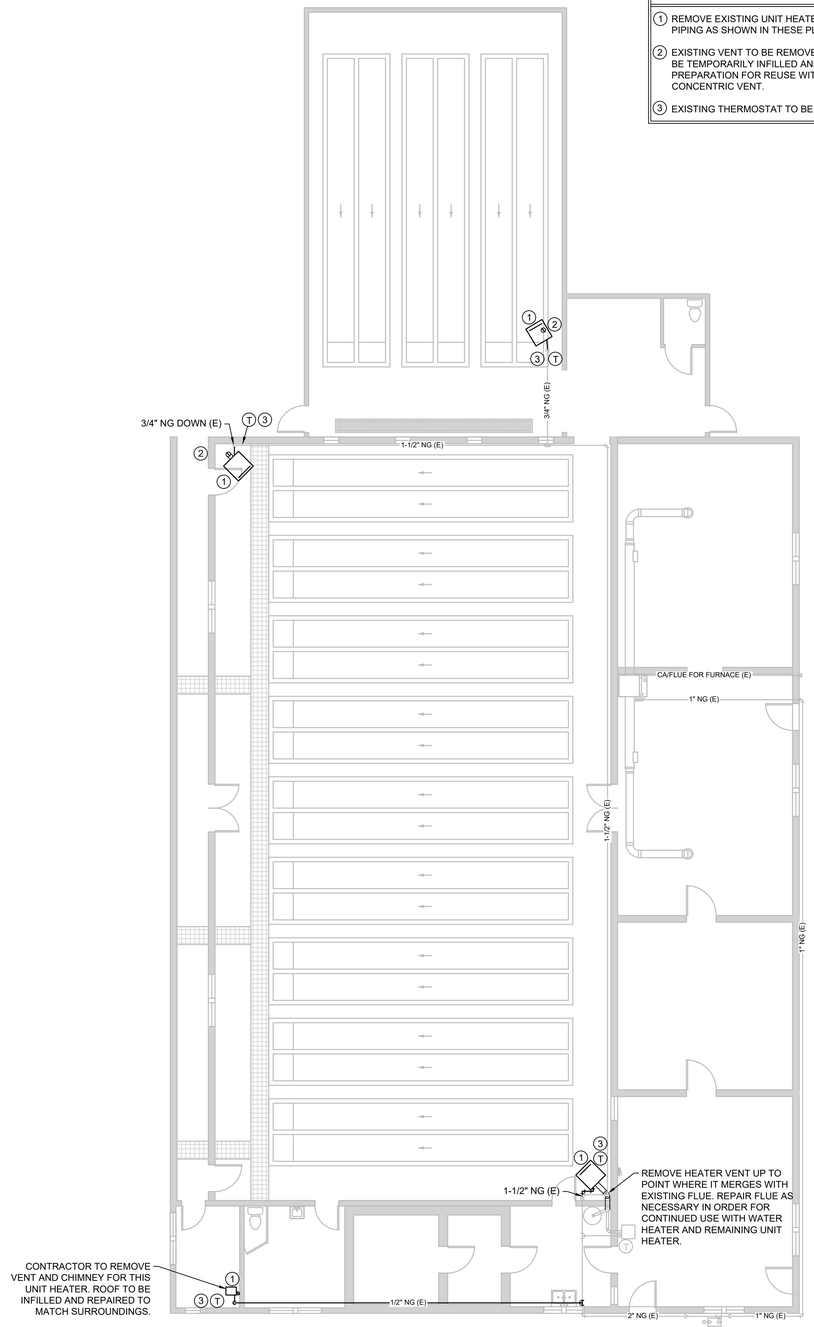
SHEET NUMBER
M 0.1

## GENERAL MECHANICAL DEMOLITION NOTE

ALL EXISTING NG PIPING SHOWN IN GREY TO REMAIN.

## KEYED MECHANICAL DEMOLITION NOTES

1. REMOVE EXISTING UNIT HEATER. MODIFY EXISTING NG PIPING AS SHOWN IN THESE PLANS.
2. EXISTING VENT TO BE REMOVED. ROOF PENETRATION TO BE TEMPORARILY INFILLED AND WATERPROOFED IN PREPARATION FOR REUSE WITH NEW UNIT HEATER CONCENTRIC VENT.
3. EXISTING THERMOSTAT TO BE REMOVED.




1 M1.0 MECHANICAL DEMOLITION PLAN
SCALE: 1/8"=1'

## GENERAL NEW MECHANICAL NOTES

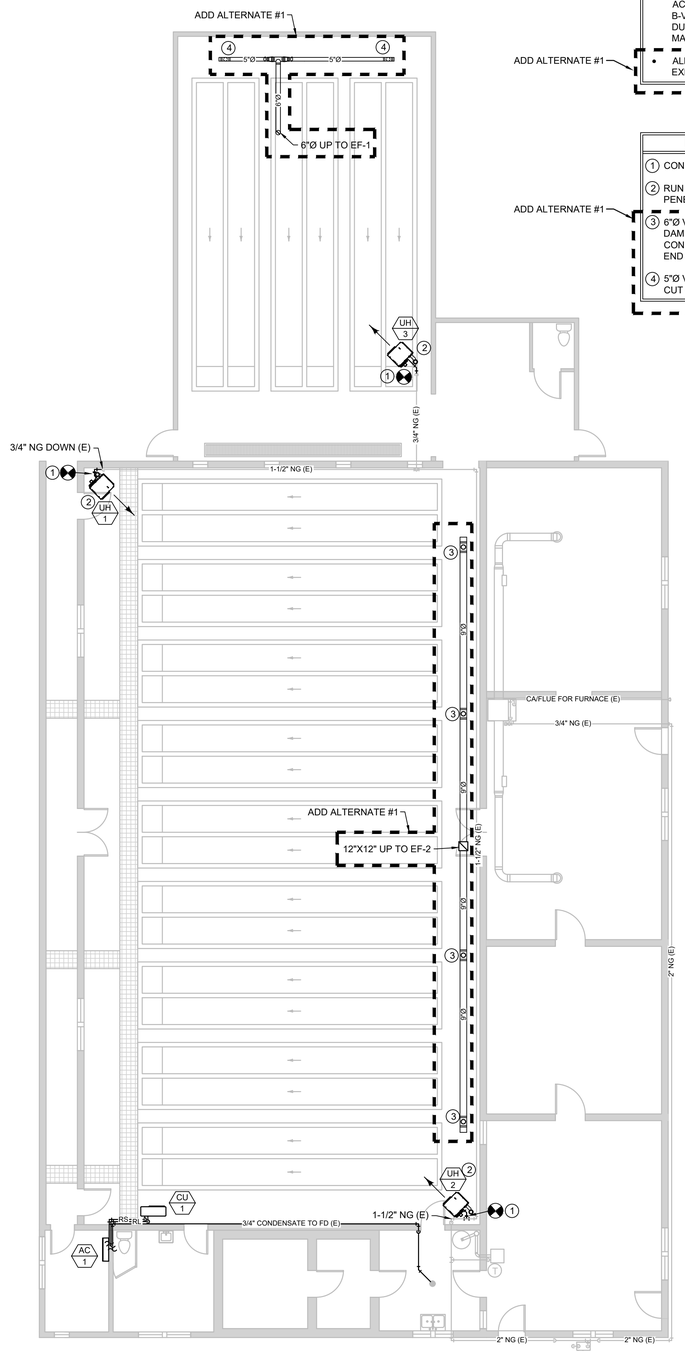
- CONTRACTOR TO VERIFY LOCATIONS AND SIZES OF ALL EXISTING NATURAL GAS PIPING.
- CONTRACTOR TO MODIFY ROOF OPENINGS TO ACCOMODATE 1" CLEAR TO COMBUSTIBLE FOR NEW B-VENT AND NEW SINGLE WALL COMBINATION AIR DUCT AND CONCENTRIC VENT KIT (PROVIDED BY MANUFACTURER OF UNIT HEATER).
- ALL EXHAUST DUCT UP TO ROOF FANS TO BE EXPOSED SPIRAL DUCT MOUNTED NEAR CEILING.

ADD ALTERNATE #1

## KEYED NEW MECHANICAL NOTES

1. CONNECT TO EXISTING NATURAL GAS PIPING.
2. RUN NEW CONCENTRIC VENT UP TO EXISTING ROOF PENETRATION.
3. 6"Ø VERTICAL BRANCH DOWN TO 12" AFF. BALANCING DAMPER IN VERTICAL SECTION OF DUCT AT 6" FROM TEE CONNECTION. DUCT TO BE CUT AND LEFT WITH OPEN END AND NO GRD ATTACHED.
4. 5"Ø VERTICAL BRANCH DOWN TO 12" AFF. DUCT TO BE CUT AND LEFT WITH OPEN END AND NO GRD ATTACHED.

ADD ALTERNATE #1




2 M1.0 NEW MECHANICAL PLAN
SCALE: 1/8"=1'



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MONTANA RAYMOND E. DAWES No. 9800PE LICENSED PROFESSIONAL ENGINEER

MONTANA FWP - BIG SPRINGS FISH HATCHERY

2051 FISH HATCHERY ROAD
LEWISTOWN, MT. 59457

SHEET CONTENTS:

MECHANICAL PLANS

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CHECKED BY: RD
REV #: -
REV DATE: -

| REV # | DATE |
|---|---|
| | |

SHEET NUMBER
M 1.0

# ELECTRICAL LEGEND

| SYMBOL | DESCRIPTION |
|---|---|
| | DUPLEX OUTLET, STANDARD HEIGHT/COORD ELEV. |
| | DOUBLE DUPLEX RECEPTACLE |
| 42" @ GFCI | GROUND FAULT CIRCUIT INTERRUPTER OUTLET |
| | 220 VOLT RECEPTACLE |
| @ WP | WEATHER PROOF OUTLET WITH COVER W/ GFCI |
| 42" @ | DUPLEX OUTLET, ELEVATION CALLOUT |
| J | JUNCTION BOX |
| | BRANCH CIRCUIT PANEL |
| | FUSED DISCONNECT SWITCH |
| | COMBINATION MOTOR STARTER / DISCONNECT |
| | STARTER/CONTACTOR |
| T | THERMOSTAT |
| $S_{WU}$ | SWITCH, WIND UP TIMER |
| $S_{P}$ | SWITCH, PILOT DUTY/CONTROL LEG CONTACTOR |
| S | SWITCH, SPST |
| $S_{D}$ | SWITCH, SPDT |
| $S_{3}$ | SWITCH, 3-WAY |
| $S_{4}$ | SWITCH, 4-WAY |
| $S_{OS}$ | SWITCH, OCCUPANCY SENSOR-DUAL TECHNOLOGY |
| $S_{OM}$ | SWITCH, OCCUPANCY SENSOR-MOTION DETECTOR |
| OS PE | OCCUPANCY SENSOR, CEILING |
| $S_{PE}$ | SWITCH, PHOTOCELL WITH REMOTE CONTROLLER |
| $S_{O}$ | SWITCH, OCCUPANCY SENSOR-DUAL TECHNOLOGY |
| | FIRE ALARM STROBE |
| | FIRE ALARM HORN/STROBE |
| S | FIRE ALARM SMOKE DETECTOR |
| H | FIRE ALARM HEAT SENSOR |
| | FIRE ALARM DUCT SMOKE DETECTOR |
| P | FIRE ALARM PULL STATION |
| DH | FIRE ALARM DOOR HOLD |
| | EXIT LIGHT FIXTURE |
| | EXIT LIGHT FIXTURE WITH DIRECTIONAL ARROW |
| | EMERGENCY LIGHT FIXTURE WITH EXIT SIGN |
| | EMERGENCY LIGHT FIXTURE |
| | TELEPHONE/DATA OUTLET (COMBINATION) |
| | TELEPHONE OUTLET OR DATA OUTLET |
| | CEILING LIGHT |
| | WALL LIGHT |
| | CIRCUIT HOMERUN |
| (E) | REPRESENTS EXISTING CONDITION |

# ELECTRICAL HARDWARE

CONDUIT & RACEWAYS SHALL BE CONCEALED AND APPROVED FOR USE AND LOCATION.

DRY LOCATIONS - GRC, IMC, EMT.
UNDERGROUND - GRC, PVC.
FLEXIBLE CONDUIT - ALLOWED ONLY FOR CONNECTION OF EQUIPMENT AND LIMITED TO LENGTHS OF SIX FEET. GALVANIZED, LIQUID TIGHT. MC OR AC ALLOWED WHEN PROTECTED. PROVIDE SEPARATE EQUIPMENT GROUNDING CONDUCTOR IN CONDUIT.
NM-B CABLE - NOT ALLOWED.

JUNCTION AND PULL BOXES:
DRY LOCATIONS - STEEL WITH COVERS.
WET LOCATIONS - CAST ALUMINUM.
SIZE PER NEC.

COUPLINGS AND CONNECTORS:
GRC - THREADED
IMC - THREADED
EMT - DRY-COMPRESSION OR SET SCREW, BOTH OF STEEL, WET-RAIN TIGHT
PVC - CEMENT JOINT TYPE
INDENTER TYPE CONNECTORS PROHIBITED.

CABELING DEVICES AND PLATES:
DUPLEX OUTLETS - HUBBELL #CR20 SERIES, 20 AMP (OR APPROVED EQUAL)
GFCI OUTLETS - HUBBELL #GF20 SERIES, 20 AMP (OR APPROVED EQUAL)
AC SWITCHES - HUBBELL #CS120 SERIES (OR APPROVED EQUAL) FOR 3 WAY OR 4 WAY USE EQUIVALENT
DEVICE COLOR - COORDINATE COLOR W/ OWNER OR ARCHITECT
PLATES - NYLON. COORDINATE COLOR W/ OWNER OR ARCHITECT
OCCUPANCY SENSORS - HUBBELL #WS120W (OR APPROVED EQUAL)

ANCHORS:
HOLLOW MASONRY - TOGGLE BOLT.
SOLID MASONRY - EXPANSION BOLT.
STEEL - METAL MACHINE SCREWS, BOLTS.
WOOD - WOOD SCREWS.

# MOUNTING HEIGHTS

| DESCRIPTION | HEIGHT UNLESS OTHERWISE NOTED |
|---|---|
| THERMOSTAT, CONTROLLER | 48" |
| WALL SWITCH/ OCCUPANCY SENSOR | 46" |
| CONVENIENCE OUTLET | 18" |
| WALL SWITCHES | 46" |
| TELEPHONE/DATA/TV OUTLETS | 18" |
| FIRE ALARM MANUAL STATION | 42" |
| FIRE ALARM HORNS & STROBES | 80"-96" AFF TO CENTER OF STROBE |
| EXIT SIGN | CENTER, 4" ABOVE DOOR |
| MANUAL MOTOR STARTER SWITCH | 42" |
| PANELBOARDS, CABINETS | 72" |
| MOUNTING HEIGHTS TO TOP OF BOX AND ABOVE FINISHED FLOOR GRADE UNLESS NOTED OTHERWISE. MATCH EXISTING MOUNTING HEIGHTS WHICH COMPLY WITH ADA REQUIREMENT. | |

# BASIC ELECTRICAL REQUIREMENTS

FURNISH ALL LABOR AND MATERIALS AND PERFORM ALL OPERATIONS NECESSARY FOR THE INSTALLATION OF COMPLETE AND OPERATING ELECTRICAL SYSTEMS SUBJECT TO THE CONDITIONS OF THE CONTRACT. PROVIDE SATISFACTORY OPERATION OF ALL EQUIPMENT AND CONTROLS TO THE ARCHITECT/ENGINEER UPON REQUEST.

ALL MATERIALS SHALL BE NEW. SUBSTITUTIONS SHALL BE APPROVED BY OWNER AND/OR ENGINEER.

VISIT THE PREMISES BEFORE SUBMITTING BID AS NO CHANGE ORDERS WILL BE ALLOWED FOR LACK OF KNOWLEDGE OF EXISTING CONDITIONS.

COORDINATE AND ORDER THE PROGRESS OF WORK TO CONFORM TO THE PROJECT SCHEDULE AND THE PROGRESS OF THE WORK OF THE OTHER TRADES.

ELECTRICAL DRAWINGS ARE DIAGRAMMATIC AND BECAUSE OF THE SMALL SCALE, IT IS NOT POSSIBLE TO INDICATE EVERY REQUIRED OFFSET, FITTING, ETC. VERIFY ALL SPACE REQUIREMENTS, COORDINATING WITH OTHER TRADES, AND INSTALL THE SYSTEMS IN THE SPACE PROVIDED WITHOUT EXTRA CHARGES TO THE OWNER.

PERFORM WORK IN ACCORDANCE WITH GOOD COMMERCIAL PRACTICE. THE GOOD APPEARANCE OF THE FINISHED WORK SHALL BE OF EQUAL IMPORTANCE WITH ITS ELECTRICAL EFFICIENCY AND INTENT. THE OWNER MAY REJECT WORK IF WORKMANSHIP AND APPEARANCE ARE NOT SATISFACTORY.

INSTALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH THE MANUFACTURERS' RECOMMENDATIONS UNLESS SPECIFICALLY INDICATED OTHERWISE, OR WHERE LOCAL CODES OR REGULATIONS TAKE PRECEDENCE.

COMPLY WITH STATE AND LOCAL CODE REQUIREMENTS AND ORDINANCES. COMPLY WITH REQUIREMENTS OF THE UTILITY COMPANIES. IN THE CASE OF DIFFERENCES BETWEEN THESE REQUIREMENTS AND ORDINANCES, THE MOST STRINGENT SHALL GOVERN. CALL FOR INSPECTIONS REQUIRED BY LOCAL BUILDING INSPECTION AUTHORITY.

PLANS AND SPECIFICATIONS GO HAND IN HAND. WHAT IS REQUIRED IN ONE IS REQUIRED IN BOTH. WHERE CONFLICTS BETWEEN SPECIFICATIONS AND PLANS EXIST, THE MOST STRINGENT REQUIREMENTS SHALL APPLY.

ELECTRICAL PLANS SUPERCEDE ARCHITECTURAL PLANS. BACKGROUND FLOOR PLANS USED FOR ELECTRICAL DRAWINGS MAY SHOW DIFFERENT THAN THE FINAL ARCHITECTURAL LAYOUT. REFER TO ARCHITECTURAL DRAWINGS FOR ACTUAL DIMENSIONS AND LAYOUT PLACEMENTS FOR SPACE CONDITIONS.

ELECTRICAL DETAILS MAY OR MAY NOT BE DIRECTLY REFERENCED. ALL DETAILS SHOWN ARE TO BE USED FOR BASIS OF INSTALLATION IN ALL CASES, IN COORDINATED EFFORT WITH MANUFACTURERS INSTALLATION RECOMMENDATIONS.

ELECTRICAL SHEETS ARE NOT INTENDED TO SPECIFICALLY BE TRADE SPECIFIC TO ELECTRICAL INSTALLATION WORK. ALL MECHANICAL AND ELECTRICAL TRADES ARE RESPONSIBLE FOR FAMILIARIZING THEMSELVES AND INCLUDING A COMPLETE PACKAGE WITHIN THEIR OFFER FOR A COMPLETE SYSTEM.

AT COMPLETION OF WORK, DELIVER COMPLETED PROJECT RECORD DOCUMENTS MARKED WITH FIELD CHANGES TO OWNER.

PROVIDE A WRITTEN WARRANTY TO THE OWNER COVERING THE ENTIRE ELECTRICAL WORK TO BE FREE FROM DEFECTIVE MATERIALS, EQUIPMENT AND WORKMANSHIP FOR A PERIOD OF 1 YEAR AFTER DATE OF ACCEPTANCE.

CLEAN EXPOSED SURFACES OF LIGHT FIXTURES, SWITCHGEAR, AND OTHER EXPOSED ITEMS OF GREASE, DIRT OR OTHER FOREIGN MATERIAL. REMOVE RUBBISH AND DEBRIS RESULTING FROM THE OPERATIONS AND LEAVE EQUIPMENT SPACES CLEAN AND READY FOR USE.

MAINTAIN ALL CEILING, FLOOR AND WALL FIRE AND SMOKE PROTECTION RATINGS. SEAL ALL CONDUIT AND ENCLOSURE PENETRATIONS TO COMPLY WITH UL ASSEMBLY AND BUILDING CODE REQUIREMENTS. ALL SEALANTS AND CONSTRUCTIONS SHALL BE APPROVED BY OWNER PRIOR TO APPLICATION. ALL OPENINGS SHALL BE SEALED DAILY.

CONTRACT DRAWINGS FOR ELECTRICAL WORK ARE IN PART DIAGRAMMATIC, INTENDED TO CONVEY THE SCOPE OF WORK AND INDICATE GENERAL ARRANGEMENT OF EQUIPMENT, CONDUITS, AND APPROXIMATE SIZES AND LOCATIONS OF EQUIPMENT AND OUTLETS. MECHANICAL/ELECTRICAL TRADES SHALL FOLLOW THESE DRAWINGS IN LAYING OUT THEIR WORK, CONSULT GENERAL CONSTRUCTION DRAWINGS TO FAMILIARIZE THEMSELVES WITH ALL CONDITIONS AFFECTING THEIR WORK, AND SHALL VERIFY SPACES IN WHICH THEIR WORK WILL BE INSTALLED. COORDINATE WORK WITH OTHER TRADES AND AS PROJECT CONDITIONS REASONABLY REQUIRE WITHOUT EXTRA COSTS TO OWNER.

ELECTRICAL SPECIFIC:
RACEWAYS SHALL BE LEFT WITH 30% FREE SPACE FOR FUTURE NEEDS.

SHARING OF NEUTRALS BETWEEN PHASES SHALL NOT BE ALLOWED.

SEPARATE GROUNDING CONDUCTORS SHALL BE PROVIDED IN ALL RACEWAYS.

CONDUCTORS SHALL BE COPPER. COLOR CODING SHALL BE NEC APPROVED AND AT MINIMUM SHALL BE AS FOLLOWS:
120/208 VOLT-BLACK, RED, BLUE FOR PHASE CONDUCTORS, WHITE FOR NEUTRAL CONDUCTORS. 277/480 VOLT-BROWN, ORANGE, YELLOW FOR PHASE CONDUCTORS, GRAY FOR NEUTRAL CONDUCTORS. GROUNDING CONDUCTORS SHALL BE GREEN.

ELECTRICAL SYSTEMS SHALL COMPLY WITH 2014 NATIONAL ELECTRICAL CODE AND BE INSTALLED BY LICENSED CONTRACTORS. LIGHTING SHALL COMPLY WITH THE 2012 IECC.

UTILITIES:
LOCATION OF UNDERGROUND UTILITIES ARE APPROXIMATE. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE EXACT LOCATIONS IN THE FIELD (NOT ALL UTILITIES ARE SHOWN).

REGULATORY AND CODE REQUIREMENTS:
APPLY FOR AND PAY FOR ALL PERMITS, FEES, LICENSES AND INSPECTIONS. ALL WORK IS SUBJECT TO APPROVAL BY THE CODE OFFICIAL AND ENGINEER. ALL CORRECTIONS SHALL BE MADE WITHOUT EXTRA COSTS TO OWNER.

811 CALL BEFORE YOU DIG

# MEP ABBREVIATIONS

| | |
|---|---|
| AFF | ABOVE FINISHED FLOOR |
| AFG | ABOVE FINISHED GRADE |
| A/G | ABOVE GRADE |
| B/G | BELOW GRADE |
| COND | CONDENSATE DRAIN |
| CWR | CHILLED (HYDRONIC) WATER RETURN |
| CWS | CHILLED (HYDRONIC) WATER SUPPLY |
| DCW | DOMESTIC (POTABLE) COLD WATER |
| DHW | DOMESTIC (POTABLE) HOT WATER |
| DHWR | DOMESTIC HOT WATER RETURN |
| EA | ENTERING AIR |
| EC | ELECTRICAL CONTRACTOR |
| EX | EXHAUST |
| G-SAN | GREASE SANITARY SEWER |
| GC | GENERAL CONTRACTOR |
| HC | HVAC CONTRACTOR |
| HWR | HOT (HYDRONIC) WATER RETURN |
| HWS | HOT (HYDRONIC) WATER SUPPLY |
| HP | HIGH PRESSURE |
| IJS | IN JOIST SPACE |
| LA | LEAVING AIR |
| LP | PROPANE GAS |
| MA | MIXED AIR |
| MC | MECHANICAL CONTRACTOR |
| MP | MEDIUM PRESSURE |
| MPG | MEDIUM PRESSURE NATURAL GAS |
| NG | NATURAL GAS |
| OA | OUTSIDE/OUTDOOR AIR |
| PC | PLUMBING CONTRACTOR |
| RA | RETURN AIR |
| RECT | RECTANGULAR |
| SA | SUPPLY AIR |
| SAN | SANITARY SEWER |
| SS | STORM WATER SEWER |
| STM | STEAM |
| SYS | SYSTEM |
| TEMP | TEMPERATURE |
| V | VENT |

## GENERAL CONSTRUCTION NOTES

ALL WORK PERFORMED IN CONJUNCTION WITH THESE DRAWINGS SHALL MEET ALL CURRENT APPLICABLE BUILDING AND ENERGY CODES.

ALL WORK PERFORMED IN CONJUNCTION WITH THESE DRAWINGS IS SUBJECT TO APPROVAL BY THE AUTHORITY HAVING JURISDICTION (CODE OFFICIAL).

ALL ROOF PENETRATIONS SHALL BE PATCHED AND SEALED, WITH WARRANTY FROM BUILDING ROOFING CONTRACTOR.

THIS SET OF DOCUMENTS IS INTENDED FOR AHJ REVIEW AND SHALL BE CONSIDERED AS CONSTRUCTION DOCUMENTS. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE ALL CONDITIONS, EXISTING AND/OR NEW, OF THE SITE AS WELL AS LOCATIONS, QUANTITIES, TYPE AND STYLE OF ALL PRODUCTS PROVIDED, WITH OWNER, PRIOR TO ORDERING OR INSTALLING.

PERMIT SET

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SHEET CONTENTS:
ELECTRICAL REQUIREMENTS & SPECIFICATIONS

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| REV # | | DATE |
|---|---|---|
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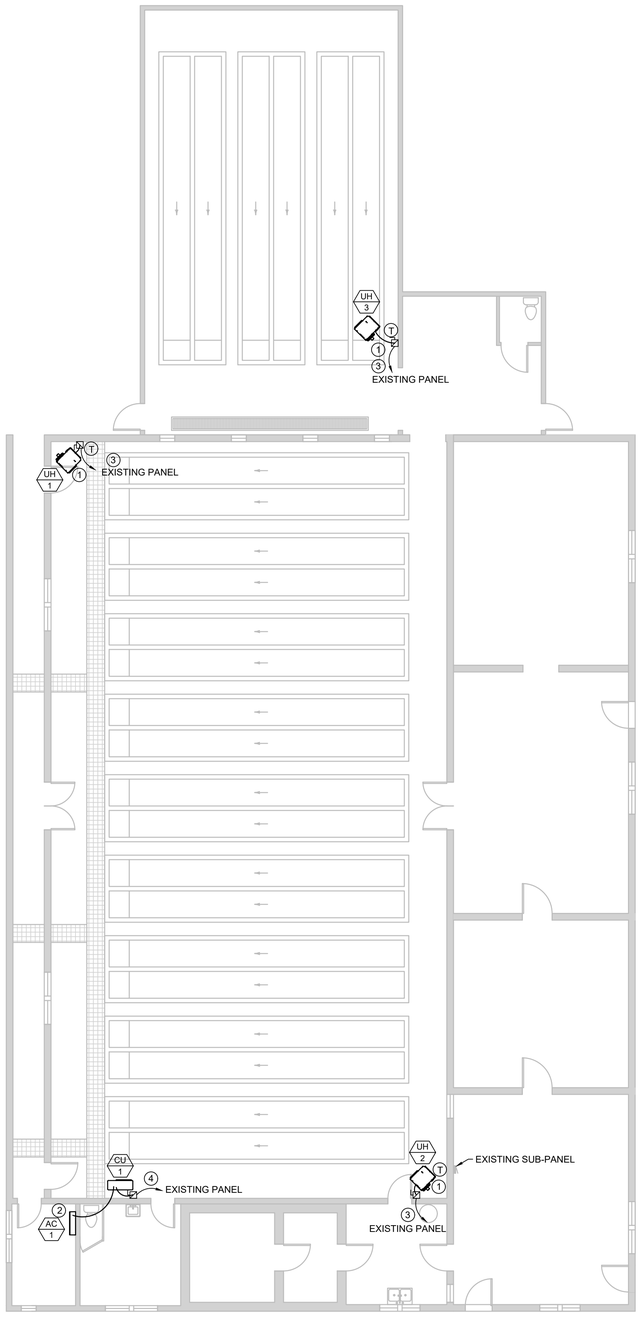


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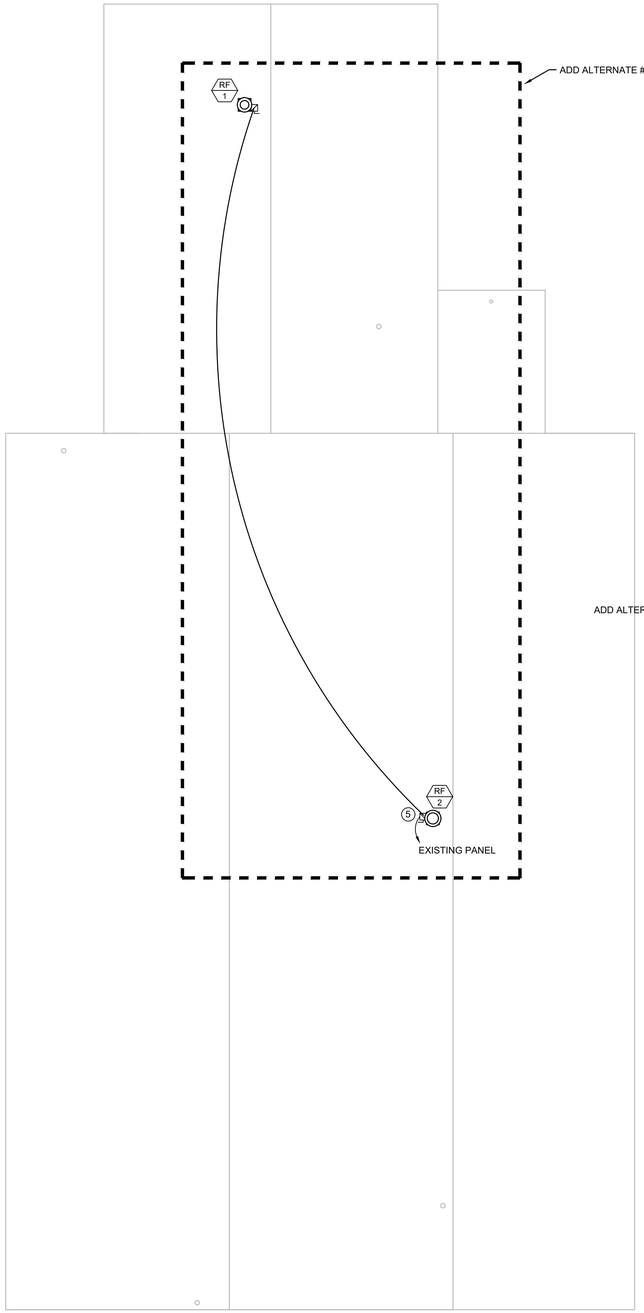
1 NEW POWER PLAN
E1.0
SCALE: 1/8"=1'

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2 NEW ROOF POWER PLAN
E1.0
SCALE: 1/8"=1'

## KEYED POWER NOTES

ADD ALTERNATE #1

1. REPLACE EXISTING FUSED DISCONNECT WITH NEW FUSED DISCONNECT AND THERMOSTAT. RECONNECT TO NEW UNIT HEATER.
2. WIRED AC CONTROLLER TO BE INSTALLED ON WALL AS HIGH AS POSSIBE.
3. RE-USE EXISTING 20A, SINGLE POLE BREAKER IN EXISTING PANEL. REPLACE WITH NEW IF NECESSARY.
4. PROVIDE NEW 20A, 2P BREAKER IN EXISTING PANEL. PROVIDE WITH 12/2 + CU GROUND IN RACEWAY WITH COMPRESSION FITTINGS.
5. PROVIDE NEW 20A, SINGLE POLE BREAKER IN EXISTING PANEL. PROVIDE WITH 12/2 + CU GROUND IN RACEWAY WITH COMPRESSION FITTINGS.

## GAS FIRED UNIT HEATER SCHEDULE

UH #

| EQUIPMENT NO. | SERVICE | CFM | INPUT (BTU) | OUTPUT (BTU) | EFFIC-IENCY A.F.U.E. | GAS RATE (CFH) | GAS CONN. SIZE | VENT OUTLET SIZE | ELECTRIC AMPS | V-PH.-CY. | MOTOR HP | MANUFACTURER & MODEL | OPTIONS-ACCESSORIES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UH-1 | HEATING | 3843 | 300K | 249K | 83% | - | 3/4 | 6 | 11 | 115-1-60 | 1/2 | REZNOR UDAS-300 | 1,2,3,4 |
| UH-2 | HEATING | 3843 | 300K | 249K | 83% | - | 3/4 | 6 | 11 | 115-1-60 | 1/2 | REZNOR UDAS-300 | 1,2,3,4 |
| UH-3 | HEATING | 1345 | 105K | 87.15K | 83% | - | 1/2 | 4 | 3.9 | 115-1-60 | 1/20 | REZNOR UDAS-100 | 1,2,3,4 |

NOTES:
1. ADD FACTORY VERTICAL COMBUSTION AIR/VENT KIT.
2. PROVIDE HONEYWELL T800 OR EQUAL.
3. PROVIDE WITH 30° DOWNTURN NOZZLE.
4. FAN IS TO RUN DURING OCCUPIED PERIODS 8AM TO 6PM EVERY DAY TO MOVE AIR INSIDE BUILDING FOR RADON MITIGATION.

## DUCTLESS SPLIT AIR CONDITIONING SYSTEM SCHEDULE

CU # / AC #

| EQUIP NO. | SERVICE | COOLING/HEATING CAPACITY (BTU/HR.) | CFM | REFRIGERANT | DESIGN TEMPERATURE (°F) INDOOR | DESIGN TEMPERATURE (°F) OUTDOOR | ELECTRICAL MCA | ELECTRICAL VOLT.-PH.-CY. | MANUFACTURER & MODEL | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| AC-1 | HEAT PUMP | 12,000/14,200 | 406 | R410-A | 70 DB | 47 DB/43 WB | 13 | 220-1-60 | TOSHIBA RAS-12EKV-UL | 1,2 |
| CU-1 | HEAT PUMP | 12,000/14,200 | 406 | R410-A | 70 DB | 47 DB/43 WB | 13 | 220-1-60 | TOSHIBA RAS-12EAV2-UL | 1,2,3 |

NOTES:
1. PROVIDE WITH WIRED CONTROLLER TO BE MOUNTED ON WALL AS SHOWN IN PLANS.
2. REFRIGERANT PIPING TO BE INSULATED SEPARATELY.
3. CONDENSING UNIT TO BE INSTALLED INDOORS AS SHOWN ON PLANS.

ADD ALTERNATE #1

## FAN SCHEDULE

EF #

| EQUIP. NO. | SERVICE | LOCATION | CFM | STATIC PRESS. (IN. W.G.) | MOTOR AMP | MOTOR HP | MOTOR SONES | MOTOR VOLT.-PH.-CY. | MANUFACTURER & MODEL | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| EF-1 | EXHAUST (ROOF) | NORTH HATCHERY | 200 | .35 | 0.65 | 1/10 | 4.8 | 115-1-60 | GREENHECK G-070-VG | 1,2,3 |
| EF-2 | EXHAUST (ROOF) | MAIN HATCHERY | 750 | .35 | 4.4 | 1/6 | 9.0 | 115-1-60 | GREENHECK G-095-VG | 1,2,3 |

NOTES:
1. FAN TO OPERATE CONTINUOUSLY.
2. PROVIDE WITH FACTORY BACKDRAFT DAMPER.

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